98. The number of cattle covered by passes for open area that was found grazing in, and impounded from, closed forests, is as given below :—

Northern Division, Kánara	...	...
Southern do.	...	...
Western do.	...	93
Belgaum ...	...	1,755
Dhárwár ...	...	289
Bijápur ...	...	...
Kolába ...	...	69
Ratnágiri ...	...	...
Total	...	2,206

99. The fact must, however, be noted that a much larger number of cattle than are impounded enter the closures. Even when they are caught, it is impossible for one or two guards to drive all of them to the pound and a good many consequently escape.

100. Wire-fencing is a good means of protection against cattle. A start was made in this direction during the year, in Kolába, and 511 reels of galvanized barbed-wire were obtained on indent from England, for fencing in some of the exploited *coupes* of 1896-97.

101. To make the closures effective, measures are being taken to introduce wire-fencing in Dhárwár and Bijápur and an indent for the required quantity of barbed wire will be submitted to Government in due course.

(*c*).—Improvement of Forest Growth.

(*1*).—*Natural Reproduction.*

(1).—By Seed.

102. *Kánara.*—Owing to the early cessation, and in some parts to the bad distribution of the rains, natural reproduction by seed was not as successful as could be expected, although other conditions were naturally favourable in the district. But notwithstanding these disadvantages to combat with, continued measures taken during the past years to prevent fires and cattle from doing any appreciable amount of damage to the pick of the forests, had their own result and the Divisional Officer, Northern Division, Kánara, reports that natural reproduction was on the whole "very fairly successful," and that it "bids fair to be much more successful in future." In the Southern Division it was "fair" and in the Western Division "not unsatisfactory."

103. In the teak-bearing tracts in the Belgaum Division, conditions were favourable for reproduction by seed.

104. Owing to the failure of rain during the latter part of the monsoon natural reproduction by seed did not fare well in Dhárwár; and in Bijápur, the season was almost entirely rainless, and, therefore, reproduction was very unsatisfactory. In Kolába, it has been very slow on account of fires and trespass by cattle. In Ratnágiri, seedlings from fallen seeds have come up in places where the soil is suitable for them to germinate, and the slopes are slowly but steadily becoming covered with vegetation, but on the whole, reproduction by seed there is far from satisfactory.

(2).—By Coppice.

105. Coppice-growth is reported to have been satisfactory throughout the Circle except in a comparatively few cases in which the soil, or the stools, have become exhausted.

(*2*).—*Artificial Regeneration.*

106. The following areas are reported to have been treated under artificial regeneration in the *Northern Division of Kánara* :—

Supa Working-Circle.—Girdling No. II Compartments in Series IV and VIII (9,020 acres).

Gund Working-Circle.—Girdling No. II Compartments in Series X and XI (4,220 acres).

107. The practice hitherto followed of raising seedlings in nurseries and then transplanting them into forests is being gradually abandoned, as it does not give good results and the cost is comparatively large. The forest guards stationed at every forest *náka* are, however, made to raise some seedlings in the compounds of their respective *nákas* and to transplant them in suitable places in forests during the rains at no cost whatever to Government.

108. A piece of ground measuring about 5 acres was prepared for a plantation in Series XI, Compartment V, in view to a mixture of seeds being sown broad-cast during the rains of 1897.

109. *Southern Division of Kánara.*—The operations connected with the dibbling in of teak seed by the side of the felled trees, were not carried out to an appreciable extent during the year, as teak seed was very scarce and the result of the operations in the previous year was not satisfactory owing to the early cessation of the rains.

110. In Yellápur, 2 nurseries were formed; and 1,390 teak seedlings out of 3,315 that were put out in the forests are reported to have survived.

111. From nurseries prepared in several selected places of the Mundgod Range, 9,090 teak seedlings were transplanted in the forests. Of this number, about 5,720 are reported to be doing well.

112. Six bags of teak seed were sown broad-cast in the forests of Yellápur and Mundgod, with no satisfactory results.

113. The Divisional Forest Officer reports that "no satisfactory results from artificial reproduction can be expected either from dibbling in of seeds or from raising seedlings in nurseries for transplanting until a sufficiently large establishment is sanctioned to allow of such operations being carried out systematically under proper supervision."

114. *Western Division of Kánara.*—In the Kárwár Range, 900 fresh teak seedlings were raised in nurseries at the Márdi and Bálémané *Nákás*. The 400 teak seedlings referred to in paragraph 106 of the last Administration Report, were put out in the forests during the rains of 1896, but only 150 of these are reported to have survived.

115. In the Ankola Range, about 5,000 teak plants were planted out and 6,000 teak seeds were sown; of these two lots, 6,300 plants are reported to be thriving.

116. Almost all the plants that were transplanted from nurseries in the Katgál forests (Kumta Range) during past years, are reported to have died during the year under report.

117. About 14 maunds of seeds of sorts were sown broad-cast in the Kumta Range.

118. *Belgaum Division.*—Nothing was done in this direction during the year owing partly to press of work connected with other important operations, and partly to unsatisfactory nature of the results obtained in past years.

119. *Dhárwár.*—Owing to the unseasonable rainfall, forest-fires and harmful grazing, the attempts made in the way of artificial reproduction, were not attended with success.

120. *Bijápur.*—1,495 seers of seeds of sorts were collected and sown broad-cast, but the result was extremely poor.

121. *Kolába.*—Three plantations were started near large rivers in the Panvel, Nágothna and Roha ranges for raising teak seedlings to be planted out in *coupes* and in addition to these, seeds were dibbled in as opposed to broad-casting, by hired labour under the supervision of forest subordinates. All Forest Guards were made to collect 5 maunds of seeds of sorts for sowing and any additional quantity that was wanted and could be got was purchased from the wild tribes at 4 annas per maund.

122. A sum of Rs. 25,000 was sanctioned by Government for expenditure on sowing and planting operations in Kolába, and part of this sum was spent on

that account up to 30th June 1897. Owing to the dryness of the hills in the district, and to the difficulty in finding suitable places for nurseries in or near forests, such as the banks of streams and rivers having a constant water-supply, it is very doubtful, if anything in the shape of an equal return for the large amount of money spent on the raising of seedlings in nurseries and transplanting them in *coupes*, may be looked for. On the other hand, much may be said in favour of systematic sowings of seeds by dibbling in exploited areas. This method of sowing does not cost much and the seedlings need no further care. Sowing in coupes with a mixture of seeds, combined with a judicious selection of a sufficient number of healthy seed-bearing standards, appears to be the best means for obtaining both artificial and natural reproduction for the reboisement of felled areas. Of course, wire-fencing and efficient measures for fire-protection, would, to a large extent, favour the forest-growth.

123. *Ratnágiri.*—2 *khandis*, 4 *maunds* of seed were collected by guards and sown broad-cast in the forest, but the results were not successful.

124. 31,100 seedlings were raised in the nurseries and 10,760 plants were planted out in the Dápoli plantation.

(*3*).—*Early Thinnings.*

125. In the Northern Division of Kánara, 206 acres of the Barchi plantation and 697 acres of series XI, in the Gund Working-Circle, were thinned. It is reported that the exact area over which the thinning extended in the Supa Working-Circle, could not be ascertained as the operations were scattered all over the forests as formerly. In future, thinnings will extend over the same area as the main fellings.

126. In the Southern Division of Kánara, 5 square miles of the Mundgod forests were thinned.

127. In the Western Division of Kánara, 577 acres of the Kadrá, Mardi and Sulgeri teak plantations were thinned.

128. 4,500 acres were thinned in the Khánápur Range of Belgaum.

129. No such operations were carried out in the other divisions of the Circle.

(*4*).—*Other operations for the improvement of the Forest.*

130. In the Northern Division of Kánara, creepers were cut by the Forest Guards over the whole area of the organized forests, at no expense to Government. Creepers and inferior species were also cut out of the Barchi, Singatgeri and Bomanhalli plantations at a cost of Rs. 252.

131. In the Southern Division of Kánara, trees of inferior species which were impeding the growth of young teak were girdled to death at a cost of Rs. 130.

132. Inferior species on 1,290 acres in the Western Division, Kánara, and on 1,387 acres in the Belgaum Division, were also girdled to death.

133. In the Ratnágiri Division, creepers were cut by Forest Guards in the Khed and Málvan ranges, and trees of inferior species on 39 acres were girdled to death.

(*5*).—*Experiments.*

134. No experiments with exotic seeds were made during the year in any of the divisions of the Circle.

135. In the Southern Division, Kánara, experiments with seed of the *Santalum album* were made in the Yellápur and Mundgod Ranges, and 147 seedlings from 1′ to 4′ in height are reported to have survived.

136. All the *Swietenia macrophylla* seedlings planted out in Belgaum during 1894, are reported to be dead.

(*d*).—Exploitation of Major Forest Produce and (*e*).—Extraction and transport of Major Forest Produce by Land and Water.

137. There is nothing special to record under these heads.